

### AMENDMENTS TO THE SPECIFICATION

Please replace the abstract paragraph with the following rewritten abstract:

-- ~~The present invention is directed to a~~ ~~A~~ novel integrated process for the recovery of sulphate of potash (SOP) from sulphate rich bittern ~~is disclosed~~. The process requires ~~only~~ bittern and lime as raw materials. Kainite type mixed salt is obtained by fractional crystallization of the bittern, ~~and~~ ~~Kainite~~ is converted to schoenite which is subsequently reacted with muriate of potash (MOP) ~~with simultaneous removal of NaCl by processing it with water and end liquor obtained from reaction of schoenite with MOP~~ for its conversion to SOP. ~~The end~~ End liquor from kainite to schoenite conversion (SEL) ~~is used for the recovery of MOP~~. SEL is desulphated and supplemented with  $MgCl_2$  using end bittern generated in the process of making carnallite. ~~The carnallite is decomposed to get crude potash which in turn processed to get MOP. The carnallite decomposed~~ Decomposed carnallite liquor produced ~~in the decomposition of carnallite~~ is reacted with hydrated lime for preparing  $CaCl_2$  solution and high purity  $Mg(OH)_2$  having low boron content. ~~The  $CaCl_2$  solution is used for desulphatation of SEL producing high purity gypsum as a byproduct.~~ It is shown that the liquid streams containing potash are recycled in the process, and the recovery of potash in the form of SOP is quantitative. --

Please amend the paragraph beginning on page , line 8 with following paragraph:

-- U.S. Patent Application Number 2003/0080066 dated October 29, 2001 by Vohra, Rajinder N. et. al. discloses an integrated process for recovery of high purity salt, potassium chloride, and end bittern containing 7.5 gpl Br. The process is based on desulphatation of brine with distiller waste of soda ash industry or calcium chloride generated from limestone and acid. The main drawback of the patent application is that the process is less attractive when distiller waste is not available in the vicinity and the process becomes less economical when carnallite has to be obtained from bittern without production of industrial grade salt. Moreover, as in the case referred to above, it is desirable to utilize the sulphate content in bittern and produce SOP in preference to MOP.--

Please amend the paragraph beginning on page 4, line 9 with following paragraph:

-- Chinese Patent No. 1281822 corresponding to application number CN 2000-112497, 29 Aug. 2000, by Song, Wenyi; Liu, Yu; Zhao, Shixiang; Dai, Fangfa, titled method for preparing  $K_2SO_4$  from sulphate type K-containing bittern. The method comprises concentrating the bittern, separating NaCl, concentrating to obtain crude K-Mg salt containing 10-45% NaCl, crushing, mixing with saturated bittern to obtain a solution with concentration of 20-40%; removing NaCl by back-floatation, concentrating, dewatering to obtain refined K-Mg salt containing less than 5% NaCl, mixing the K-Mg salt and water at specified ratio, allowing the mixture to react at 10-60°P for 0.5-3hr, separating to obtain schoenite, mixing with KCl and water at specified ratio, allowing the mixture to react at 10-70°F for 0.25-3hr and separating to obtain  $K_2SO_4$ . The drawbacks of the process are (i) need for elaborate method of purification of mixed salt that includes removing NaCl by the less desirable method of back floatation that involves use of organic chemicals, (ii) lack of any mention of the manner in which the various effluent streams are dealt with, and (iii) dependence on outsourced KCl since no mention is made of any process for KCl production as part of the process. --

Please amend the paragraph beginning on page 7, line 4 with following paragraph:

-- It is an important object of the present invention to produce superior fertilizer, SOP, from sulphate-rich bittern sources such as sea bittern and natural bittern (including subsoil bittern and bittern with high potassium content), which contains effective amounts of K, Mg and  $SO_4$  suitable for kainite production, in a cost effective manner through integration with production of valuable co-products.--

Please amend the paragraph beginning on page 9, line 1 with following paragraph:

-- It may be noted that certain steps of the above process are triggered initially with  $CaCl_2$  and water procured externally and thereafter these are largely generated in the process of the invention as described above. In one embodiment of the invention, the mixed salt contains KCl-15-22%, NaCl-15-22%,  $MgSO_4$ -28-40%,  $MgCl_2$ -5-10%. --

Please amend the paragraph beginning on page 10, line 1 with following paragraph:

-- Another object is to replace conventionally employed slaked lime with  $\text{Mg}(\text{OH})_2$  generated in the process of the invention for neutralization of acidic debrominated bittern to eliminate sludge formation when acids such as sulphuric acid are employed for acidulation of bittern and instead make such bittern immediately useful for mixed salt production. The bittern used in the invention requires the least evaporation to produce kainite mixed salt, and waste bittern sources including debrominated bittern effluent. --

Please amend the paragraph beginning on page 10, line 5 with following paragraph:

-- The main inventive step is the recognition that the step of transforming kainite in mixed salt into schoenite and leaching of  $\text{NaCl}$  from mixed salt can be simultaneously performed in a single operation with minimum loss of  $\text{KCl}$  in mixed salt. Another inventive step is self reliance wherein the need for outsourced MOP is minimized by producing it instead from the waste filtrate of schoenite manufacture. Another inventive step is the desulphatation of SEL required for MOP production using calcium chloride generated *in situ* from the  $\text{MgCl}_2$  in desulphated SEL. that shows up as  $\text{MgCl}_2$  -rich streams of carnallite decomposed liquor and end liquor. Another inventive step is the coupling of  $\text{Mg}(\text{OH})_2$  production with desulphatation of SEL and thereby eliminating the problem of  $\text{CaCl}_2$  waste management otherwise encountered in production of  $\text{Mg}(\text{OH})_2$  from  $\text{brine}$  or bittern. Another inventive step is the use of CDL primarily for  $\text{Mg}(\text{OH})_2$  production which greatly reduces  $\text{B}_2\text{O}_3$  impurity in  $\text{Mg}(\text{OH})_2$  and, as a result, in  $\text{MgO}$  obtained there from. Another inventive step is the local use of crude  $\text{Mg}(\text{OH})_2$  for neutralization of acidified debrominated bittern prior to production of mixed salt. Another inventive step is the recycling of liquid effluents to minimize requirement of fresh water while simultaneously enhancing recoveries and addressing the problem of effluent disposal.--

Please amend the paragraph beginning on page 11, line 29 with following paragraph:

-- 104 kg of mixed salt analyzing KCl -14.1%, NaCl -16.5%, MgSO<sub>4</sub> -41.6%, was reacted with 100 L of KEL ~~analysing~~ analyzing as K<sub>2</sub>SO<sub>4</sub>-13.9%, NaCl - 2.8%, and MgCl<sub>2</sub> 11.6%, and 40 L of water for 2 hr. The slurry was centrifuged to get 34.8 kg of schoenite analyzing K<sub>2</sub>SO<sub>4</sub> -37.0%, MgSO<sub>4</sub> - 30.3%, and NaCl - 4.9%, , and 190.0 L of filtrate (SEL) ~~analysing~~ analyzing as KCl - 9.5%, NaCl - 13.0010, MgSO<sub>4</sub> - 15.1% , MgCl<sub>2</sub>-8.0% and The schoenite was further reacted with a solution of 12.5 kg MOP in 46.0 L of water for 3.5 hr to yield 17.5 kg SOP and 80 L of KEL. The SOP ~~analysed~~ analyzed as K<sub>2</sub>SO<sub>4</sub> - 97.3%, NaCl - 0.2%, and MgSO<sub>4</sub> - 3.0%~~a=~~ and KEL as KCl - 16.7%, NaCl - 1.3%, MgSO<sub>4</sub> - 11.0%, and MgCl<sub>2</sub>- 2.7%.--

Please amend the paragraph beginning on page 12, line 5 with following paragraph:

-- In this experiment 150.0 kg of mixed salt ~~analysing~~ analyzing as KCl - 13.1%, NaCl - 19.8%, MgSO<sub>4</sub> - 38.0%, MgCl<sub>2</sub>- 1.9%, and was taken in a vessel along with 160 L of KEL, analyzing KCl - 17.0%, NaCl -; 3.3%, MgSO<sub>4</sub> - 9-0%, MgCl<sub>2</sub>- 1.9%, and 60 L of water and stirred for 2 hr. The resultant slurry was centrifuged to get 49.9 kg of schoenite analyzing K<sub>2</sub>SO<sub>4</sub> - 42.0%, MgSO<sub>4</sub> - 32.2%, NaCl - 0.7%, and 255 L of filtrate (SEL) ~~analysing~~ analyzing as KCl -10.5%, NaCl - 12.3%, MgSO<sub>4</sub> - 13.7%, MgCl<sub>2</sub>-6.70%. The schoenite was reacted with a solution of 19.0 kg of MOP in 75 L of water for 3.5 hr in a vessel with continuous stirring. The slurry was centrifuged to get 27.0 kg of SOP ~~analysed~~ analyzed as K<sub>2</sub>SO<sub>4</sub> - 94.3%, NaCl - 0.2%, and MgSO<sub>4</sub> - 3.7%, and 85 L of filtrate (KEL), ~~analysing~~ analyzing as KCl - 15.5%, NaCl - 0.8%, MgSO<sub>4</sub> - 10.5%, and MgCl<sub>2</sub> -3.0%.--

Please amend the paragraph beginning on page 16, line 1 with following paragraph:

-- ~~Claims:~~ We claim: --